PDNO.: 200311220-1
Inventor(s): Gary L. Vondran, Jr. et. al.
Title: "Methods and Systems for Processing Print Jobs"
Atty: Susan E. Heminger (650)236-2738
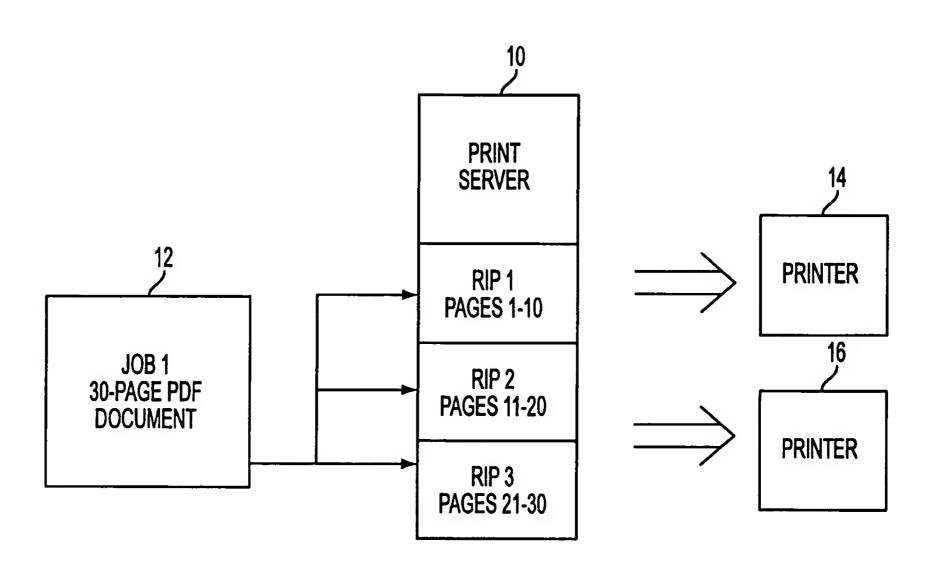
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FIG. 1
PRIOR ART

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FIG. 2

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Title: "Methods and Systems for Processing Print Jobs"
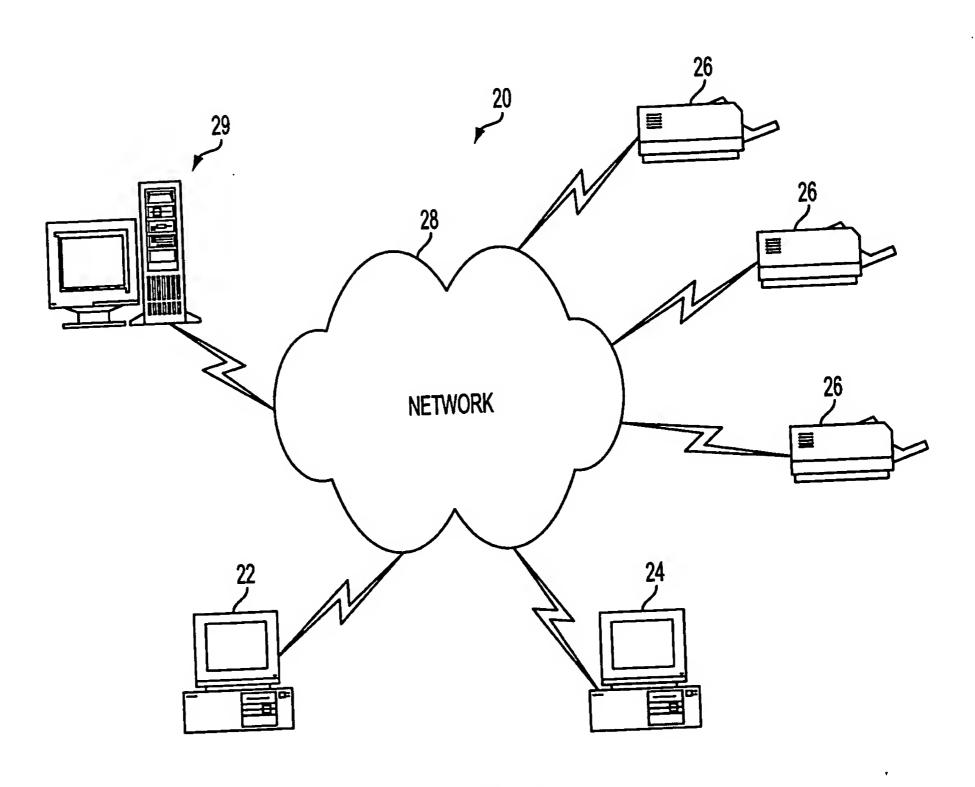*Atty: Susan E. Heminger (650)236-2738*

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FIG. 3

PDNO.: 200311220-1
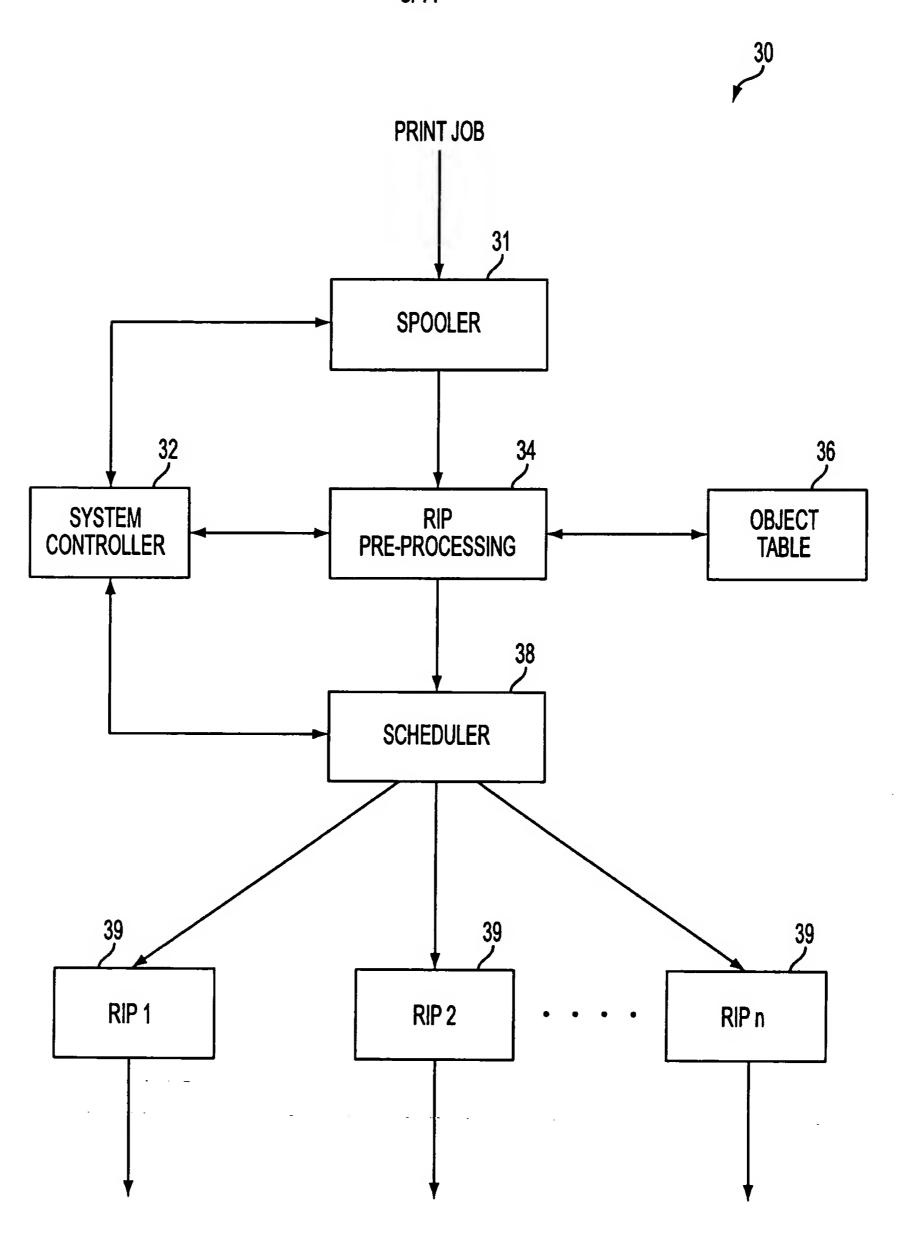Inventor(s): Gary L. Vondran, Jr. et. al.
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START

SELECT AN OBJECT — 400

OBJECT HAS A MATCH? — 402

NO

MORE OBJECTS? — 406

YES

NO

YES

INCREMENT NUMBER OF USAGES — 404

END

FIG. 4A

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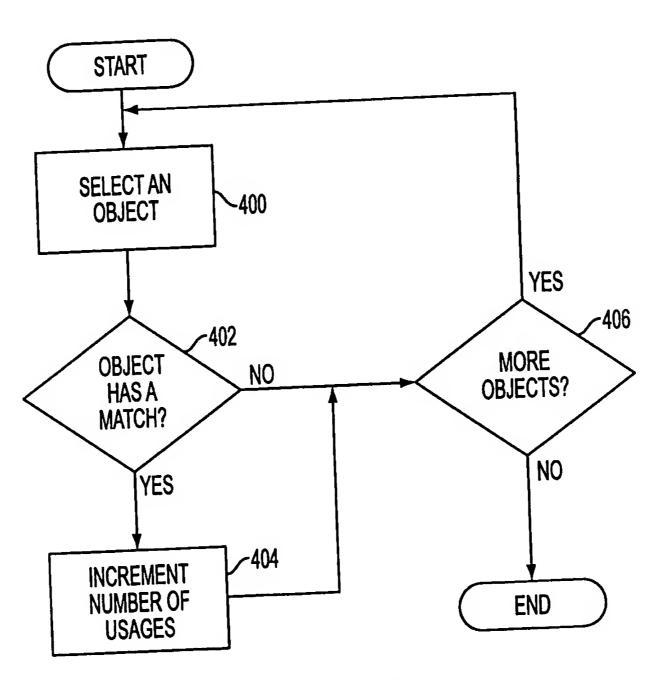Inventor(s): Gary L. Vondran, Jr. et. al.
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Atty: Susan E. Heminger (650)236-2738

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START

SELECT NEXT OBJECT — 40

TRANSFORM OBJECT — 42

GENERATE OBJECT SIGNATURE — 44

HASH SIGNATURE INTO OBJECT TABLE — 46

UPGRADE USAGE PROFILE — 49

SIGNATURE MATCH ? — 48

YES

UPDATE REF. TO MATCHING OBJECT — 50

NO

INSERT CURRENT OBJECT INTO OBJECT TABLE — 52

MORE OBJECTS ? — 51

YES

NO

END
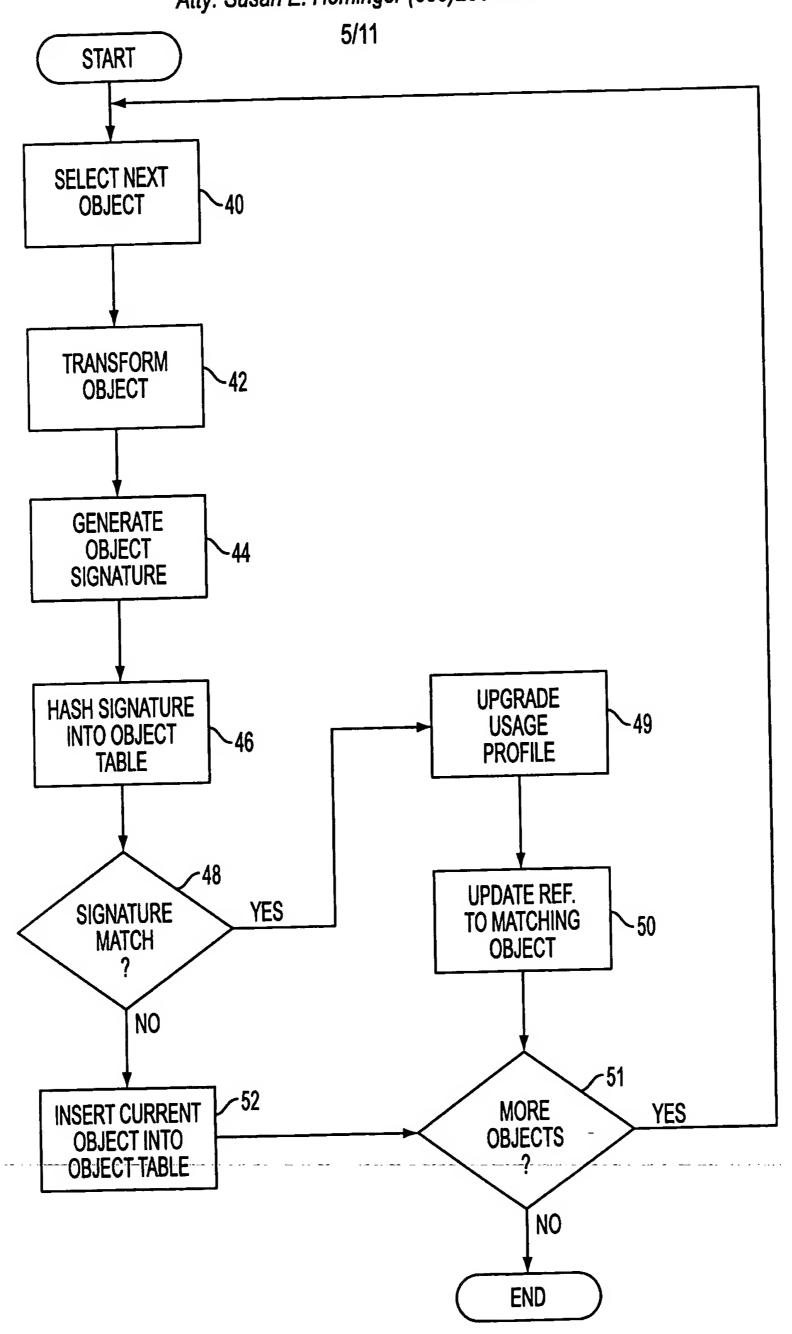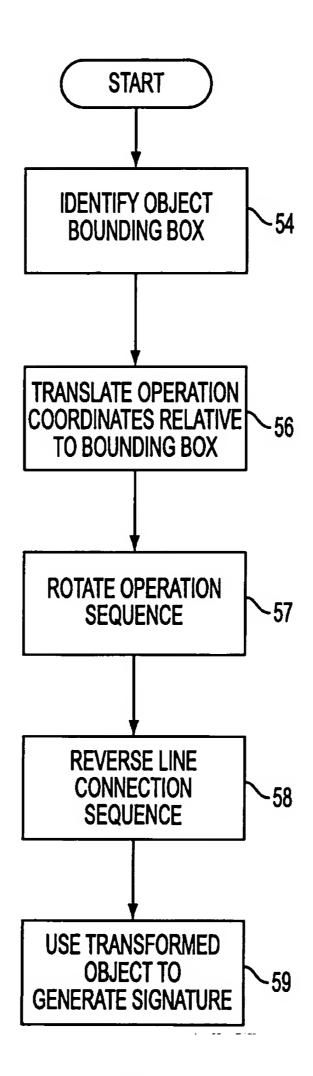
FIG. 4B

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Title: "Methods and Systems for Processing Print Jobs"
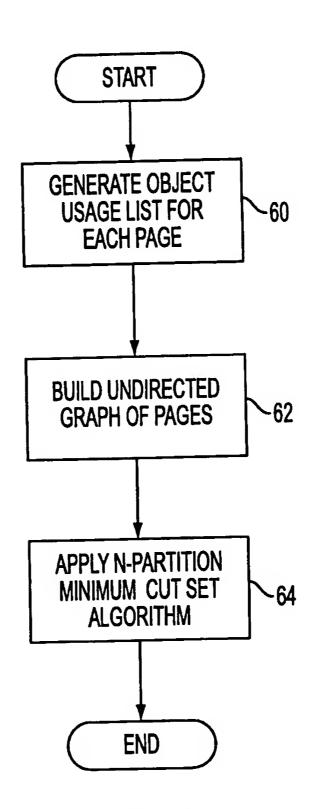Atty: Susan E. Heminger (650)236-2738

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```
                    ┌─────────────┐
                    │    START    │
                    └──────┬──────┘
                           │
                           ▼
              ┌──────────────────────┐
              │   IDENTIFY OBJECT     │ ╲
              │    BOUNDING BOX       │  54
              └──────────┬───────────┘
                         │
                         ▼
              ┌──────────────────────┐
              │  TRANSLATE OPERATION  │
              │ COORDINATES RELATIVE  │ ╲ 56
              │   TO BOUNDING BOX     │
              └──────────┬───────────┘
                         │
                         ▼
              ┌──────────────────────┐
              │   ROTATE OPERATION    │ ╲
              │      SEQUENCE         │  57
              └──────────┬───────────┘
                         │
                         ▼
              ┌──────────────────────┐
              │    REVERSE LINE       │
              │    CONNECTION         │ ╲ 58
              │     SEQUENCE          │
              └──────────┬───────────┘
                         │
                         ▼
              ┌──────────────────────┐
              │   USE TRANSFORMED     │
              │     OBJECT TO         │ ╲ 59
              │ GENERATE SIGNATURE    │
              └──────────────────────┘
```
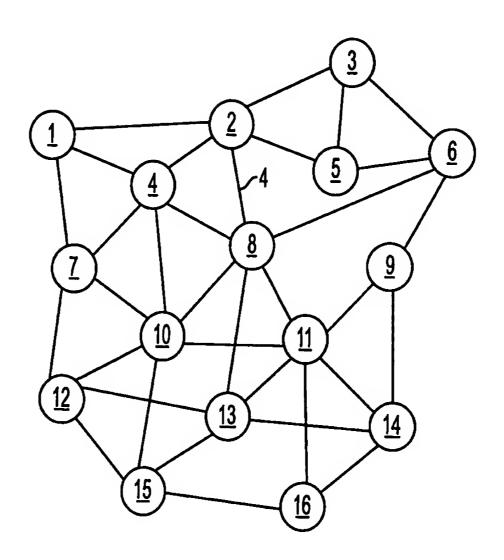
FIG. 5

PDNO.: 200311220-1
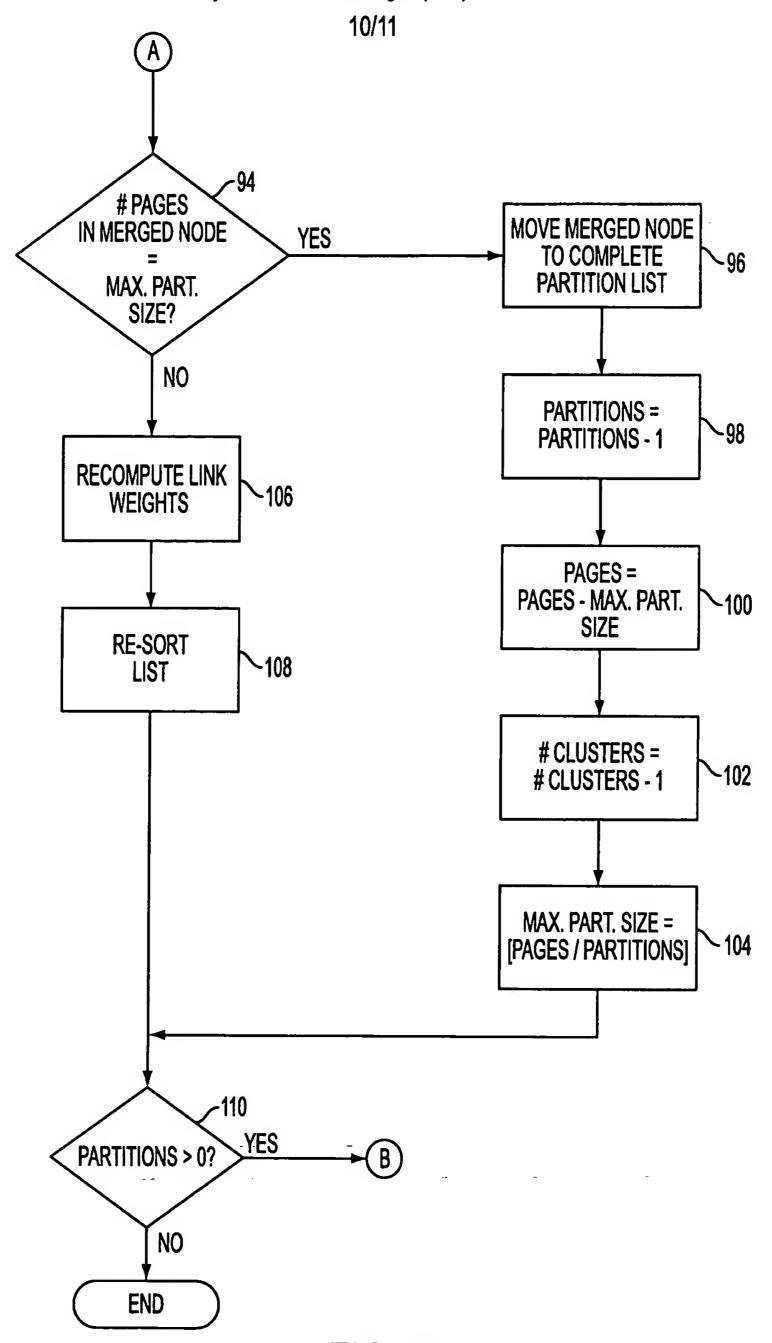Inventor(s): Gary L. Vondran, Jr. et. al.
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START

GENERATE OBJECT
USAGE LIST FOR
EACH PAGE ───60

BUILD UNDIRECTED
GRAPH OF PAGES ───62

APPLY N-PARTITION
MINIMUM CUT SET
ALGORITHM ───64

END

FIG. 6

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FIG. 7

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INITIALIZE
VALUES ⟋80

COMPUTE LINK
WEIGHTS AND
SORT ⟋82

(B) →

SELECT NEXT
LINK ENTRY ⟋84

⟋86
COMBINED
END NODES PAGE LIST
>
MAX. PART.
SIZE? —— YES ——→ (B)

NO

⟋88
MERGER
OF NODES
RESULTS IN NEW
CLUSTER? —— YES ——→

⟋90
CLUSTERS
= PARTITIONS? —— YES ——→ (B)

NO

CLUSTERS
= # CLUSTERS + 1 ⟋91

NO

MERGE LINK'S
END NODES ⟋92

(A)

FIG. 8A

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(A)

PAGES
IN MERGED NODE
=
MAX. PART.
SIZE? — 94

YES → MOVE MERGED NODE TO COMPLETE PARTITION LIST — 96

↓

PARTITIONS =
PARTITIONS - 1 — 98

↓

PAGES =
PAGES - MAX. PART.
SIZE — 100

↓

CLUSTERS =
CLUSTERS - 1 — 102

↓

MAX. PART. SIZE =
[PAGES / PARTITIONS] — 104

NO

↓

RECOMPUTE LINK
WEIGHTS — 106

↓

RE-SORT
LIST — 108

↓

PARTITIONS > 0? — 110

YES → (B)

NO

↓

END

FIG. 8B

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PDF FILE W/ EMBEDDED OBJECT
USAGE PROFILE

```
<PDF Header>

<PDF Body>

xref
´ `R
0000000000 65535 f
0000000019 00000 n
0000000480 00000 n
0000000503 00000 n
0000171680 00000 n
0000171714 00000 n
0000171733 00000 n
0000171883 00000 n
0000171902 00000 n
0000171994 00000 n
0000172143 00000 n
0000172163 00000 n
0000172314 00000 n
0000172334 00000 n
0000172427 00000 n
0000172579 00000 n
0000172670 00000 n
0000172724 00000 n
trailer
<<
<Size 18
<Root 16 0 R
<Info 1 0 R
<ID
[<2dfa5b50259373513075b4f
332ce2208><2dfa5b50259373
913075b4f332ce2208>]
>>
startxref

   EOF
```

Usage Profile Object (Flate encoded form)

```
17 0 obj
<< /Length 167 /Filter /FlateDecode >>
stream
xœÔ+OÊ
··NLO
(ÊOEÎIUˆæRº±Q0T¨6ˆUºª_sŒ_¢
_Œˆä_u_RÊ1¢_'··
<a_Œ_ÂÁÂÀP_Ω+æp≠<´e`tf¨§>Ýtv¨
_-J
ª¯__6¬´ &<F(ÍÀô___8__X@œ___~_Di3V'∞
XÁEµb___″_ª<+ f_b&S{″´´ØL_å
_@Ṱ__å€Š`·__:_G@
endstream
endobj
```

Non-Compressed Object
Usage Profile Stream

```
/ObjUsageProfile<<
1 5
5[1 3 4 5 8]
3
3[3 4 5]
2[1 2]
7[2 2 4 4 6 6 6]
8 3
2[6 7]
2[6 7]
4[1 2 6 7]
13 5
4[1 2 2 2]
3[4 6 8]
1[0]
3[2 4 4]
1[9 9]
>>
```

Usage info for object 1
thru 5. Note object 2
does not include the
optional page list

Usage info for object 8
thru 10.

Usage info for object 13
thru 17. Note object 15
used prior to page 1 and
object 17 used after last
page (page 8).

FIG. 9